



# Taking climate change here and now – mitigating ideological polarization with psychological distance

Haoran Chu\*, Janet Z. Yang

Department of Communication, University at Buffalo, State University of New York, Buffalo, NY, USA



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## ABSTRACT

Construal level theory of psychological distance suggests that people are likely to pay more attention to contextual cues when appraising proximal, rather than distant stimuli. We tested the theory in the climate change context by examining if framing climate change impacts in a psychologically close way may motivate the American public to support climate-mitigating policies and enact climate-mitigating actions, accounting for their political ideology, cultural worldview, and environmental value. Results of an experimental survey based on a large adult sample ( $N = 1,086$ ) supported some of our hypotheses. Ideological polarization in climate change perception was reduced when climate change impact was portrayed as influencing a spatially close and familiar exemplar, as compared to a spatially distant and novel exemplar. However, cultural worldview and environmental value had consistent influence on policy support and environmental action, regardless of message framing.

## 1. Introduction

Through political events such as Brexit and the 2016 U.S. presidential election, global societies are seeing a rapid increase in ideological polarization (Pew Research Center, 2014). Disagreement among the public has become more pronounced and reconciliation is harder to achieve (Bolsen et al., 2015). One critical challenge posed by ideological polarization is that, despite scientific consensus, some members of our society hold skeptical views about climate change. Driven by elite cues and other socioeconomic considerations, political conservatives tend to dismiss the catastrophic potential of climate change and refuse to attribute its cause to human activities (Gauchat, 2012), which undermines the much-needed mitigation effort.

Ideology is a system of interconnected values that play essential roles in individuals' personal and social lives (Jost et al., 2009). Like other values, ideology is characterized by its invariance and continuity in influencing people's attitudes and actions over time and across circumstances (Davidov et al., 2008; Feather, 1995). Its invariability is useful when individuals try to make decisions in novel situations where ideology serves as a heuristic cue (Schwartz and Bilsky, 1990). However, ideology could also prevent people from updating their thoughts and actions based on contextual information, as in the case of increased climate change skepticism among political conservatives despite abundant scientific evidence (Egan and Mullin, 2017).

The worsening impacts of climate change and a lack of collective, unified action in our society pose a challenge for climate scientists and communicators. That is, climate communication scholars and practitioners need to identify more effective strategies to engage with political conservatives so that they do not automatically ignore information related to climate change. One possible theoretical lens to address this challenge is construal level theory (CLT) of psychological distance (Trope and Liberman, 2010). CLT suggests that people use different levels of abstraction to think of an event or an object (i.e. mental construal) based on their perceived distance from the self at the here and now (i.e. psychological distance). CLT also suggests that people tend to value higher-level and more abstract features of a distant object more so than when the object is perceived as psychologically close (Bar-Anan et al., 2007; Eyal et al., 2009).

Characteristics associated with higher-level construals are those that remain constant after abstraction, whereas those related to lower-level construals rely more on contextual and situational information (Eyal et al., 2009; Ledgerwood et al., 2010). As value assumes consistency in determining people's evaluations of and reactions to stimuli, they are more likely to influence people's response to higher-level construals of distant objects (Fujita et al., 2008; Ledgerwood et al., 2010). Considering that the impacts of climate change are often on the global scale and mostly projected to occur in the future, it is reasonable to believe that fundamental values such as political ideology, cultural worldview,

\* Corresponding author at: Department of Communication, 359 Baldy Hall, University at Buffalo, State University of New York, Buffalo, NY, 14260, USA.  
E-mail address: [hchu5@buffalo.edu](mailto:hchu5@buffalo.edu) (H. Chu).

and environmental value are likely to influence people's attitudes toward climate change. Nonetheless, political psychologists argue that compared to political ideology, which often serves as a loose guideline for people's attitude formation (Krantz and Monroe, 2016), other operational ideologies may have a stronger impact on people's attitudes toward specific social issues (Jost et al., 2009). For instance, Free and Cantril (1967) found that many Americans opposed “big government” as an abstract idea but supported individual programs comprising the New Deal welfare. Other political scientists have found similar results, showing that more than two-thirds of Americans who identify themselves as symbolic conservatives are operational liberals (Page and Shapiro, 1992; Stimson, 2004; Zaller, 1992). Thus, as compared to political ideology, cultural worldview and environmental value may have a stronger, more persistent relationship with people's attitude toward climate change.

In order to untangle how psychological distance and value work together to influence support for climate change mitigation, this study employs an experimental design to test whether narrowing the perceived distance of climate change impacts or employing a novel exemplar influences Americans' attitudes differently, depending on their political ideology, cultural worldview, and environmental value. Below, we first review research on psychological distance and its application in climate change communication. We then move on to discuss how different aspects of ideology may play a role in influencing people's response to climate change message framing.

## 2. Literature review

### 2.1. Psychological distance of climate change

Psychological distance is not a new framework in climate change communication research (Brügger et al., 2015a; McDonald et al., 2015). Some studies show that narrowing the perceived distance of climate change impacts leads to greater concern for climate change and more climate engagement (Jones et al., 2017; Scannell and Gifford, 2011). Other studies demonstrate that political ideology (Rickard et al., 2016) or skepticism (Brügger et al., 2015b) serves as important moderating factors in influencing people's response. In contrast, Whitmarsh (2008) found that direct experience with flooding, an extreme event related to climate change, does not lead to heightened concern or intention to address the issue. Similarly, Spence et al. (2012) also did not find a significant relationship between psychological distance and willingness to act, although perceived distance is significantly related to concern about climate change. Based on CLT, proximizing climate change impacts should not automatically promote climate engagement (Brügger et al., 2015a; McDonald et al., 2015). In particular, Brügger et al. (2015a) argue that psychological distance should only influence whether people are more likely to pay attention to relatively concrete, contextualized information or relatively abstract, generalized information when forming opinions. Supporting this proposition, Schuldt et al. (2017) found that more proximal distance cues lead participants to describe a video related to climate change impacts on the Maldives using more concrete descriptions.

From the CLT perspective, the contrast between desirability and feasibility may also explain why narrowing the psychological distance of climate change impacts does not automatically increase climate engagement. Research has shown that people are more concerned about desirability for events that carry greater psychological distance, but they weigh feasibility more for events with closer psychological distance (Liberman and Trope, 1998; Liviatan et al., 2008; Todorov et al., 2007). For instance, Liberman and Trope (1998) found that people value desirability (i.e. interesting topic) more than feasibility (i.e. convenient timing) when deciding whether to attend a guest lecture in the distant versus near future. Similarly, Todorov et al. (2007) showed that as the likelihood of getting a reward increases (reduced hypothetical distance), individuals favor more feasible, yet less desirable

options, such as getting a smaller prize in a convenient location rather than getting a bigger prize that demands more effort.

As far as climate change is concerned, the colossal scale of its influence on human societies may render an individual powerless and thus stimulate the “flight” response, especially when the feasibility of climate change mitigation weighs more than its desirability (Gifford, 2011; O'Neill and Nicholson-Cole, 2009). For instance, although presenting the threatening imagery of climate change may attract people's attention to this issue, making “fear” more salient, it could also reduce people's intention to engage in mitigation actions (O'Neill and Nicholson-Cole, 2009). Similarly, mitigating climate change may be overwhelming and thus an “inconvenient” task for ordinary citizens (Lorenzoni et al., 2007). One may hence argue that while bringing climate change impacts closer may increase the perceived need for mitigation, it could also hinder people's willingness to take actions. Based on the mixed theoretical argument and empirical evidence, a research question is proposed to examine the effect of distance framing:

**RQ1:** How does distance framing influence people's responses to messages about climate change impacts?

There are four interrelated dimensions of psychological distance – spatial, social, temporal, and hypotheticality (Trope and Liberman, 2010). Spatial distance denotes how far an object is physically removed from the perceiver, and it is often intertwined with social distance. Temporal distance involves either future projection or recall of past events (Trope and Liberman, 2003). Hypotheticality, or uncertainty, depicts the likelihood that an event will occur. CLT suggests that perceptions related to the four dimensions of psychological distance interact with each other and mental position of an object on one dimension usually leads to similar positions on the other dimensions (Fujita et al., 2006a, 2006b). For instance, low-probability events are typically perceived as being farther away (Trope and Liberman, 2010).

Apart from these four dimensions, other distance-related concepts also influence people's mental construals and subsequent attitudes and behaviors (Fiedler, 2007; Trope and Liberman, 2010). Novelty, sometimes referred to as experiential distance, demarcates how familiar a person is to an object, and more experience with an object leads to a more concrete construal (Fiedler, 2007; Förster et al., 2009). Supporting this claim, studies have shown that simply priming participants to think of a categorization task as novel renders them better at identifying high-level, general categories than low-level, specific ones (Förster et al., 2009). Field research also lends support to novelty's influence on construal level and behavioral intentions. For instance, as compared to local residents, tourists who have less experience with historical sites are more likely to form abstract imagery of the sites and use less-specific words to describe them (Hunter and Suh, 2007; Walmsley and Jenkins, 1992).

Notably, researchers have also called for a closer look at novel climate change impacts on people's lives (Leviston et al., 2014; McDonald et al., 2015). On one hand, as the global impacts of climate change are often imperceptible at the individual level (e.g., 50-cm sea level rise in a year), the high experiential distance of climate change may lead to lower concern about this phenomenon (McDonald et al., 2015). On the other hand, objects such as polar bears and icebergs, with which most people do not have direct experience, have been at the center of climate change communication research and media coverage (Leviston et al., 2014). The scarcity in the utilization of low-level and familiar objects to represent climate change impacts on human lives calls for research attention (Leviston et al., 2014), which leads to our second research question:

**RQ2:** How does novelty framing influence people's responses to messages about climate change impacts?

As a psychologically distant event is often construed with abstraction, people usually pay more attention to higher-level features. On the contrary, people's focus shifts to lower-level features when the event is perceived as psychologically close (Trope and Liberman, 2003). Through attention and weight assigned to high or low-level features,

psychological distance could thus determine people's evaluation, prediction, and course of action (Trope et al., 2007). Among various high vs. low-level comparisons, ideological value and contextual information are a dyad of competitive features (Eyal et al., 2009). For instance, Ledgerwood et al. (2010) found that people tend to attune their standing towards a psychologically close issue to their social context (i.e. another person's attitude), but make judgements and decisions that are more congruent with their pre-existing ideology when the issue is portrayed as further away. Similarly, Eyal et al. (2009) demonstrated that benevolence, as a value, has a greater influence on participants' intention to volunteer in an experiment that is projected to occur in the distant future. In addition to these experimental studies, applied research investigating psychological distance's role in shaping people's perception of unconventional oil and gas development (UOGD) also finds that ideology's impacts increased along with the physical distance between UOGD sites and the perceivers (Clarke et al., 2016).

Notably, although ideology has often been assessed as a unidimensional construct in communication studies, political psychologists argue that it is a multidimensional system that includes both symbolic political ideology and operational issue-specific ideology (Jost et al., 2009). Symbolic political ideology often serves as an "identity marker," which motivates people to act in congruence with their political identity as either liberals or conservatives (Fiorina and Abrams, 2008; Hart and Nisbet, 2012; Kiely et al., 2001). However, the link between political ideology and issue-specific attitudes in the climate change context is not absolute. For instance, conservatism does not always lead to antagonistic attitudes towards environmental protection and conservation (Dunlap and McCright, 2008). Despite embracing conservative values, forest landowners and farmers often show strong favorable attitudes towards environmental conservation (Butler et al., 2007; Krantz and Monroe, 2016; Liu et al., 2013). Because increased psychological distance leads to more attention to abstract, higher-level features (Smith and Trope, 2006; Wakslak et al., 2006), we expect symbolic ideology to have a more pronounced effect on people's responses to climate messages at farther psychological distance or when a novel exemplar is featured. Thus, we first hypothesize that,

**H1.** Political ideology would interact with distance/novelty framing such that the impact of political ideology on people's responses to these messages would be strongest at farther distance/novel exemplars and weakest at closer distance/familiar exemplars.

Related to the climate change context, two values that have been researched extensively in the literature are likely to serve as operational ideologies that could lead to specific issue-based opinions – cultural worldview (see for example, Ahern et al., 2016) and environmental value (see for example, Dietz et al., 2005).

Rooted in the cultural cognition thesis, cultural worldview positions people's values onto two interrelated axes – group and grid (Kahan et al., 2011). Individualism and communitarianism represent the two ends of the group axis, whereas hierarchy and egalitarianism anchor the grid axis. Aligning with other cultural cognition research, Bolsen et al. (2015) found that people in the individualistic-hierarchical quadrant, who embrace the conservative ideology, are more likely to dismiss the existence and anthropogenic nature of climate change, while those on its diagonal, the communitarian-egalitarian quadrant, uphold the scientific consensus on climate change more. Due to its specificity in shaping people's opinions about contested social and political issues, cultural worldview is likely to have a stronger impact on people's attitudes toward climate change than symbolic political ideology (Kahan and Braman, 2006). Nonetheless, reflecting individuals' deeply-held values about social hierarchy and equality, the impact of cultural worldview may also be more pronounced at relatively greater psychological distance. Thus, we next hypothesize that,

**H2.** Cultural worldview would interact with distance/novelty framing such that the impact of cultural worldview on people's responses to

these messages would be strongest at farther distance/novel exemplars and weakest at closer/familiar exemplars.

Environmental values are consistently related to people's perceptions of climate change (Dietz et al., 2005; Whitmarsh and O'Neill, 2010). In particular, individuals who hold pro-environment values typically report greater support for climate change mitigation policies (Yang et al., 2015) and heightened intention to engage in environmental behaviors (Van der Werff et al., 2013). Observably, environmental values capture beliefs that are tightly bound to environmental issues such as climate change. Thus, regardless of the type of climate change impacts mentioned, those with pro-environment values should be more likely to express concern about the issue and support climate change mitigation, which is consistent with the vast amount of empirical evidence. Thus, our final hypothesis is,

**H3.** Environmental values would be significantly related to people's responses to the messages regardless of distance/novelty framing.

## 2.2. The present study

To gauge individuals' response to messages about climate change impacts, we utilize mitigation policy support, environmental behavioral intention, risk perception, and affective responses as criteria variables. The first two capture the influence of psychological distance and value on climate engagement, while the last two focus more on people's concern about climate change.

As a global-scale phenomenon, inter-governmental collaborations are necessary to address the impacts of climate change (Pachauri et al., 2014). Thus, public support for climate change mitigation policies is an important indicator to assess (see for example, Yang et al., 2015). Individuals' willingness to engage in environmental behavior is also frequently examined in the literature (Jones et al., 2017; Myers et al., 2012; van der Werff et al., 2013). Risk perception related to climate change significantly influences people's support for climate change mitigation (Bostrom et al., 2012; Rickard et al., 2016). Similarly, affect plays an important role in determining people's response to climate messages (Leiserowitz, 2006). Including the affective component of risk perception also answers Trope and Liberman's (2010) call for research that investigates the impact of psychological distance on emotions. Given the myriad criteria variables, rather than proposing specific hypotheses, we will test the main hypotheses for each one separately and organize the results section accordingly.

## 3. Method

### 3.1. Sample

We recruited participants from Amazon Mechanical Turk (MTurk) in the summer of 2017 ( $N = 1,098$ ) to take an online experimental survey hosted on Qualtrics for an incentive of US\$0.75. Amazon MTurk has been utilized widely in communication and other social science research and it is considered a valid channel for participant recruitment (Buhrmester et al., 2011). Though such samples often overrepresent individuals with higher education and more liberal political orientation, research also suggests that MTurk workers' ideological standings in general mirror those of the general public and are thus valid for research related to political ideology (Clifford et al., 2015). Our sample is composed of 54.5% female ( $n = 594$ ) and the average age is 36.97 ( $SD = 12.46$ ). Medium income of our participants falls into the bracket of \$35,000 - \$49,999 and the majority of our participants have received a four-year college degree.

### 3.2. Stimuli

The experimental survey utilized a  $2 \times 2$  design with a control

group. Instead of using traditional textual stimuli, we employed four animated videos illustrating climate change impacts, featuring far or close spatial distance along with novel or familiar exemplars. Participants in the control group ( $n = 236$ ) did not watch any video. Spatial distance was manipulated by presenting the impacts of climate change in the U.S. or in Indonesia, an island nation in Southeast Asia.<sup>1</sup> Participants in the novel exemplar conditions watched videos featuring Babesiosis, a tick-borne disease (Vannier et al., 2008), while those in the familiar exemplar conditions watched videos about the impact of climate change on coffee.

The very uncommon disease and a staple beverage were utilized for two reasons. First, past research has pushed for greater attention to the impact of climate change on public health (e.g., Myers et al., 2012). Second, both exemplars may have substantial impacts on people's overall quality of life, which means participants are likely to view them as relevant and important issues. A series of manipulation check questions indicate that in general, participants reported feeling more familiar with coffee than with Babesiosis ( $M_{\text{coffee}} = 91.84$ ,  $SD_{\text{coffee}} = 17.21$ ;  $M_{\text{babesiosis}} = 11.85$ ,  $SD_{\text{babesiosis}} = 23.24$ ; paired-sample  $t(1090) = 90.06$ ,  $p < .001$ , Cohen's  $d = 3.91$ ), even when they were in the Babesiosis groups ( $M_{\text{coffee}} = 92.44$ ,  $SD_{\text{coffee}} = 16.56$ ;  $M_{\text{babesiosis}} = 21.04$ ,  $SD_{\text{babesiosis}} = 28.56$ ; paired-sample  $t(425) = 44.38$ ,  $p < .001$ , Cohen's  $d = 3.06$ ).

All videos were created on PowToon.com with the same color template and background music, and they were of the same length (1 min 45 s). Three segments were included in all videos – introduction to the exemplar (i.e. Babesiosis vs. Coffee) in the U.S. or in Indonesia, relevant impact of climate change, and a call for action related to policy support and pro-environment behaviors.

### 3.3. Measurement

Demographic variables and the proposed moderators (i.e. political ideology, cultural worldview, and environmental value) were measured before exposure to the videos. Criteria variables were measured post-exposure.

Participants' political ideology was measured on a scale from "very conservative" (1) to "very liberal" (7) ( $M = 4.55$ ,  $SD = 1.84$ ). More than half of the sample were more liberal leaning (54.7%). Around one third of the participants identified themselves as conservative leaning (29.6%), with 15.7% holding middle-of-the-road ideology. There is no significant difference in participants' political ideology across experimental conditions,  $F(4,1085) = 0.93$ ,  $p = 0.45$ .

Cultural worldview was assessed using the 12-item cultural cognition worldview scale (Kahan et al., 2011). Six items in the scale measured the grid factor, capturing participants' position on the egalitarianism-hierarchy axis, and the other six assessed the group factor, assessing participants' communitarianism-individualism leaning. Following Kahan et al. (2011), participants were asked to indicate the extent to which they agreed with the 12 items on a 6-point Likert scale (1 = strongly disagree to 6 = strongly agree). Both sub-scales achieved excellent reliability ( $\alpha = 0.91$  for grid;  $\alpha = 0.85$  for group). There is no significant between-condition difference in either factor,  $F_{\text{grid}}(4, 1086) = 0.34$ ,  $p = 0.85$ ;  $F_{\text{group}}(4, 1086) = 1.06$ ,  $p = 0.37$ .

Environmental value was assessed with six items adopted from Dietz et al. (1998). Each item was measured with a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Consistent with previous research, the scale emerged with a two-factor structure. The first factor 'Progress versus Environment (PvE)' ( $\alpha = 0.87$ ,  $r = 0.76$ ) was measured with two items – "We worry too much about the future of the

environment, and not enough about prices and jobs today;" "People worry too much about human progress harming the environment." The second factor 'Fragility of Nature (FoN)' ( $\alpha = 0.76$ ) was assessed with four items – "Almost everything we do in modern life harms the environment," "Nature would be at peace and in harmony if only human beings would leave it alone," "Any change humans cause in nature-no matter how scientific-is likely to make things worse," and "Economic growth always harms the environment." Again, no between-group difference was found in these two sub-factors,  $F_{\text{PvE}}(4, 1086) = 0.23$ ,  $p = 0.92$ ;  $F_{\text{FoN}}(4, 1086) = 0.95$ ,  $p = 0.43$ .

Four criteria variables were assessed. Similar to other climate change communication studies, we asked participants to indicate the extent to which they oppose or support five climate change mitigation policies, ranging from "regulating carbon dioxide as a pollutant," to "providing tax rebates to people who purchase energy-efficient vehicles" (Zhao et al., 2011). None of the policies directly involves tax increment or other motions that would require personal sacrifice to reduce the influence of feasibility concern. Participants' support for these policies was measured on a 7-point scale (1 = strongly oppose to 7 = strongly support), and the scale was statistically reliable ( $\alpha = .90$ ,  $M = 5.71$ ,  $SD = 1.34$ ).

In addition to policy support, we also asked our participants to estimate the likelihood of them performing five environmental behaviors on a 7-point scale (1 = not at all likely to 7 = extremely likely). All assessed behaviors require individual engagement but do not involve excessive personal sacrifice or exertion, such as "turning off lights when they are not needed," and "walking or biking instead of driving if possible." (Yang et al., 2015). The five-item scale was moderately reliable ( $\alpha = .68$ ,  $M = 5.39$ ,  $SD = 1.11$ ).

Risk perception was measured with three items, assessing participants' perceived risks from climate change to different entities, including themselves and their community, future generations, and people all over the world (Rickard et al., 2016). Item responses were recorded with a 5-point Likert scale (1 = not at all likely to 5 = extremely likely). Upon reliability check ( $\alpha = .92$ ), these items were averaged to create an index for risk perception ( $M = 3.99$ ,  $SD = 1.08$ ).

Affective response was measured with two items assessing the amount of "bad/negative" or "good/positive" (recoded) feelings participants associate with climate change (Leiserowitz, 2006) on a 1–10 semantic differential scale. These two measures correlate strongly with each other ( $\alpha = .85$ ,  $r = .74$ ,  $p < 0.001$ ), so they were averaged into an index with higher value indicating stronger negative affect ( $M = 8.00$ ,  $SD = 1.90$ ).

## 4. Results

To test for main experimental effects (RQ1&RQ2), a series of univariate analyses of variance were conducted. A significant main effect of distance framing was found for policy support,  $F(1,858) = 4.38$ ,  $p < .05$ , Cohen's  $d = .14$ . Participants in the spatially close conditions showed greater support for mitigation policies ( $M = 5.81$ ,  $SD = 1.27$ ) than those in the far conditions ( $M = 5.62$ ,  $SD = 1.41$ ). However, there was no other significant main effect. There was also no significant difference in the criteria variables between the experimental conditions and the control condition.

In response to H1, we utilized a series of univariate general linear models (GLM; different from analysis of covariance, interaction terms between the categorical framing variable and the continuous ideology variable were also used as predictors) to analyze how political ideology interacts with distance and novelty framing to influence the criteria variables. Results revealed significant interaction between distance framing and ideology in predicting policy support ( $F(1,854) = 8.53$ ,  $p < .01$ ), behavioral intention ( $F(1,854) = 4.65$ ,  $p < .05$ ) and risk perception ( $F(1,854) = 3.98$ ,  $p < .05$ ), showing that the impact of distance framing was different between liberals and conservatives. Further, a significant three-way interaction

<sup>1</sup> Similar to past research (Jones et al., 2017; Rickard et al., 2016), the spatial distance manipulation may also trigger different social distance perception. Since the present study does not aim at distinguishing the impact of various dimensions of psychological distance, this is deemed acceptable.

**Table 1**  
OLS Regression with effect-coded condition variables (control as reference group).

	Policy Support	Behavioral Intention	Risk Perception	Negative Affect
Intercept	4.177	4.753	2.631	5.728
US-Coffee ( <i>n</i> = 220)	.112	.307	.202	-.250
Indonesia- Coffee ( <i>n</i> = 216)	-.323	-.237	.012	.408
US-Babesiosis ( <i>n</i> = 218)	.547**	.068	.122	.196
Indonesia-Babesiosis ( <i>n</i> = 208)	-.443*	-.216	-.463**	-.782**
Ideology	.336***	.140***	.298***	.496***
Ideology × US-Coffee	-.025	-.074*	-.041	.049
Ideology × Indonesia- Coffee	.070	.050	.008	-.051
Ideology × US-Babesiosis	-.088*	.007	-.013	-.029
Ideology × Indonesia-Babesiosis	.071	.051	.073*	.132*
R <sup>2</sup>	.225	.062	.265	.238

Note. \**p* < .05, \*\**p* < .01, \*\*\**p* < .001.

(distance\*novelty\*ideology) was found in the model predicting negative affect ( $F(1,854) = 4.86, p < .05$ ), indicating that the impact of both distance and novelty framing on negative affect differed across participants with different ideology. Of note, no other significant interaction was found across the models, while ideology was a consistent predictor of all four criteria variables and distance framing was associated with all except for negative affect.

To further probe how ideology interacts with distance and novelty framing to influence people's response to the messages, four ordinary least square (OLS) regression models predicting the criteria variables with effect-coded condition variables, ideology, and their interaction terms were employed. Specifically, with the control group as reference group, four effect-coded condition variables were created, each representing one of the four experimental conditions. A significant positive/negative regression coefficient for a condition variable indicates an increase/decrease in the criteria variables in that condition as compared to the sample grand mean, while significant regression coefficient for an interaction term corresponds to conditional influence of ideology on the criteria variables in a particular treatment condition. Results of the regression analyses are reported in Table 1.

Participants in the Indonesia-Babesiosis (distant and novel) condition reported the lowest concern about climate change (i.e. risk perception and negative affect) as well as the lowest intention to support climate change mitigation policies. Further, ideological polarization in people's intention to engage in climate change mitigation (i.e. policy support and behavioral intention) decreased when they were exposed to messages featuring psychologically closer impacts of climate change, while this polarization in their concern about climate change (i.e. risk perception and negative affect) increased when climate change impacts were presented as psychologically distant. Therefore, H1 was supported.

We are also interested in explicating the changing patterns of ideological polarization in the criteria variables. Analyses of the simple slopes of the effect-coded treatment groups' impacts conditioned upon ideology revealed that exposure to the distant and novel (Indonesia-Babesiosis) video rendered conservative participants (ideology = 2) significantly less likely to be concerned about climate change (risk perception:  $B = -.32, SE = .10, p < .01$ ; negative affect:  $B = -.52, SE = .18, p < .01$ )<sup>2</sup> or support mitigation policies ( $B = -.30, SE = .13,$

$p < .05$ ). In contrast, exposure to psychologically close but novel condition (US-Babesiosis) increased conservatives' (ideology = 2) policy support ( $B = .28, SE = .09, p < .01$ ). More interestingly, the reduction in ideological polarization related to environmental behavioral intention among participants exposed to the close/familiar climate change impacts (US-Coffee) was caused by the dampened behavioral intention among extremely liberal participants (ideology = 7,  $B = -.21, SE = .10, p < .05$ ). Fig. 1, further demonstrates these findings by plotting ideology's impacts on the criteria variables for participants in the four treatment groups.

In response to H2, similar GLMs were conducted with distance framing, novelty framing, cultural worldview dimensions (i.e. hierarchy-egalitarianism and individualism-communitarianism) and their interaction terms as predictors of the four criteria variables. Cultural worldview exerted significant impacts on policy support (hierarchy-egalitarianism, HE hereafter:  $F(1,850) = 425.51, p < .001$ ; individualism-communitarianism, IC hereafter:  $F(1,850) = 18.48, p < .001$ ), behavioral intention, (HE:  $F(1,850) = 88.31, p < .001$ ; IC:  $F(1,850) = 2.96, p = .09$ ), risk perception (HE:  $F(1,850) = 379.56, p < .001$ ; IC:  $F(1,850) = 25.51, p < .001$ ), and negative affect (HE:  $F(1,850) = 279.51, p < .001$ ; IC:  $F(1,850) = 4.10, p < .05$ ). However, no significant interaction was found across the models. Therefore, H2 was not supported.

Another four GLMs were utilized to test H3. Consistent with our expectation, no significant interaction was found between message frames (i.e. distance and novelty) and the two sub-dimensions of environmental value (i.e. fragility of nature and progress versus the environment). However, environmental value was consistently related to policy support (fragility of nature, FoN hereafter:  $F(1,850) = 86.83, p < .001$ ; progress versus the environment, PvE hereafter:  $F(1,850) = 487.74, p < .001$ ), behavioral intention (FoN:  $F(1,850) = 23.49, p < .001$ ; PvE:  $F(1,850) = 68.40, p < .001$ ), risk perception (FoN:  $F(1,850) = 102.45, p < .001$ ; PvE:  $F(1,850) = 473.76, p < .001$ ) and negative affect (FoN:  $F(1,850) = 31.00, p < .001$ ; PvE:  $F(1,850) = 389.09, p < .001$ ). H3 is thus supported.

## 5. Discussion

Consistent with previous research (Rickard et al., 2016; Spence et al., 2012), liberals were pretty consistent when responding to messages about climate change impacts that vary based on psychological distance. Conservatives, on the other hand, were more sensitive to distance/novelty framing. The highlight of the results is that climate change impacts that are far away and novel make people rely on their political ideology the most when forming opinions about climate change mitigation. Nonetheless, liberals' intention to act decreased when close and familiar impacts are highlighted. When climate change impacts are presented as psychologically closer, people's attention may be more focused on the feasibility of mitigation effort, which may lead them to retreat from direct actions (Brügger et al., 2015a; Liberman and Trope, 1998). We thus recommend future research applying the CLT framework to consider measuring people's efficacy appraisal of climate change mitigation.

The effect of distance framing on policy support, behavioral intention, and risk perception was moderated by political ideology, while distance and novelty framing jointly influenced participants' negative affect. That is, ideological polarization was reduced when climate change impacts were brought closer to home. With this said, it is also possible that personal relevance could be a confounding factor in our research design because reducing the perceived psychological distance would unavoidably increase perceived personal relevance of climate impacts. Other studies based on the CLT framework tend to have similar issues (see for example, Jones et al., 2017; Rickard et al., 2016). Thus, future research needs to identify more effective research design to rule out the confounding influence of personal relevance or issue salience.

<sup>2</sup> Regression coefficients and standard errors estimated for the effect-coded condition variables at different level of symbolic political ideology. Positive coefficient estimated for a condition variable indicates that participants in the condition were likely to score higher than the overall sample.

Ideology's impacts on the criteria variables in different conditions

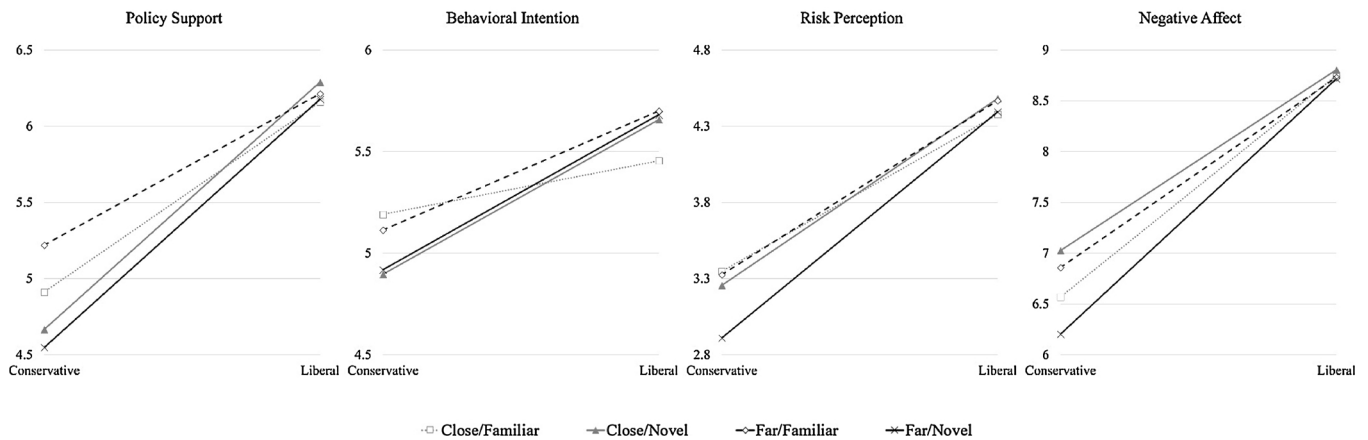


Fig. 1. Ideology's impacts on the criteria variables in different condition.

Consistent with Trope and Liberman's (2010) speculation, our results also suggest that spatial distance and novelty may work together to influence perception. Difference in conservatives' and liberals' policy support increased when climate change was presented as spatially distant, both when it was linked to a novel or a familiar exemplar. However, ideologically motivated difference in behavioral intention reduced most significantly when climate change impacts are linked to a close and familiar exemplar. Additionally, when climate change impacts are presented as both far and novel, conservative participants showed significantly lower risk perception and less negative affect, resulting in greater ideological polarization. Based on these findings, it is reasonable to conclude that although novelty, or experiential distance, is not as powerful as spatial/social distance, it can be motivating for conservatives when communication messages highlight close and familiar impacts of climate change. For instance, past research has shown that climate beliefs can influence adaptation intentions for novel risks. That is, people who believe in climate change are more likely to be concerned about a novel risk when it is associated with climate change (Alexander et al., 2012; Buys et al., 2012). Together, these studies suggest that novelty may offer a meaningful pathway for strategic communication about climate change.

Another notable finding is that participants who were extremely liberal were less motivated to engage in environmental behaviors when they were exposed to climate impacts that were psychologically close and familiar. This result further supports our assumption that psychological distance framing influences the information people rely on to form attitude and behavioral intention (Trope and Liberman, 2010). Specifically, although decrease in psychological distance may have shifted conservatives' attentions from ideological value to contextual information, it also dampened liberals' enthusiasm in specific environmental actions, perhaps because the reduced psychological distance made them more concerned about feasibility of these actions.

Cultural worldview and environmental values did not moderate the relationships between experimental factors and criteria variables. As suggested by both theory and empirical evidence (Brügger, Dessai et al., 2015; Trope and Liberman, 2010), perceived distance of climate change impacts influenced people's responses by changing the information they rely on to form judgments. As the symbolic and operational aspects of ideology differ in their specificity in shaping people's attitude and action (Jost et al., 2009), it makes sense that the more symbolic and abstract concept of political ideology is more malleable in influencing people's responses to climate change impacts when they are presented as psychologically close, as compared to the more concrete operational ideologies – cultural worldview and environmental value.

Motivated reasoning is also relevant to our discussion on psychological distance (Kunda, 1990). As variation in psychological distance

often leads to selective attention and weighing of high or low-level features, it is likely that difference in distance would also condition the accessibility of memories and cues a person needs to construct a justifiable conclusion (Trope and Liberman, 2010). Therefore, though conservatives and liberals are differently motivated to process information related to climate change, distant or close representation of the phenomenon may also influence their conclusion, as the "material" used to construct their responses differs. Notably, research has also utilized motivated reasoning to explain distance's impacts on American partisans' support for climate change mitigation policies (Hart and Nisbet, 2012). Though not explicitly discussing the influence of high or low-level construal, Hart and Nisbet (2012) argued that conservatives' policy support dwindles along with increase in distance as they are less likely to identify with climate victims from a foreign country. These individuals who suffer from climate change impacts can be considered as concrete, contextual, and thus lower-level representations of climate change impacts. Therefore, instead of arguing that the CLT framework competes with motivated reasoning to explain people's response to climate change messages featuring different psychological distance, we believe that these theories actually complement each other in explicating the mechanism in information processing.

The different impacts based on different types of ideology also carry significant implications for current social and political affairs. Though people often identify their positions on the simple "conservative-liberal" spectrum, they could still hold other personal, and more imperative, values towards specific issues. In particular, as citizens in democratic societies are increasingly pressed to make decisions on novel topics with little access to detailed information, abstraction of critical social and political issues in conjunction with reliance on symbolic political ideology may misguide their decision, and sometimes even lead to choices against their own interests. Such discrepancy calls for further customization of messages intended for different segments of the public, as simple conservative-liberal scheme may not sufficiently address the difference in individuals' concern surrounding complex issues.

Undeniably, this study has limitations. First and foremost, coffee and Babesiosis are different in many ways, not just how novel our participants viewed them. For example, Babesiosis, as a disease, naturally assumes negative connotations, while coffee, for most people, is likely to trigger positive reactions. Therefore, in addition to attributing the effect of these two exemplars to different levels of novelty, it is also possible that valence played a role. However, participants in the Indonesia-Babesiosis (distant and novel) condition reported lower negative affect than those who did not view any message, which suggests that novelty may have had a stronger impact than valence in this study.

Also relevant to the experimental manipulation is the use of

animated infographics as stimuli instead of commonly used textual or graphical information. Though this vivid illustration of climate change impacts is more engaging and potentially of higher ecological validity, it may at the same time interfere with our participants' construal of the phenomenon, as pictorial depiction is generally associated with more concrete mental construal (Amit et al., 2009). Although videos or other multimedia materials have been utilized in CLT research (e.g. Fujita et al., 2006a), we recommend future studies to investigate the possible impact of presentation format on mental construal.

Another limitation pertains to measurement. Similar to research applying CLT in various social and political contexts (e.g., Clarke et al., 2016; Rickard et al., 2016), the current study did not evaluate actual mental construal. Though our findings align with theoretical propositions, it would be meaningful to assess participants' mental construal of the stimuli. However, due to the lack of an established scale, we recommend future applications of CLT to consider manipulating participants' mental construal along with psychological distance (see for example, Katz et al., 2017). Further, the items used to measure risk perception involve social distance (people all over the world) and temporal distance (future generations) judgment, which could be a confounding factor given the distance framing manipulation.

Lastly, the utilization of an Amazon MTurk sample may have limited the generalizability of our findings because MTurk workers tend to have higher education and are more liberal leaning. We thus recommend future research testing the similar framework to utilize a more representative sample by including more conservative participants.

## 6. Conclusion

Consistent with previous research, our study once again demonstrated that distance framing significantly influenced people's evaluation of and reaction to climate change messages. Novelty framing on its own did not generate much effect, but it strengthened the effect of distance framing when they were presented in a congruent fashion (i.e. distant-novel or close-familiar). Bringing climate change impacts closer to people reduced ideological polarization, while distancing the phenomenon increased ideological polarization. Compared to symbolic political ideology, operational ideologies are more immune to changes in climate change framing, which indicates that political ideology is more influential in shaping people's thoughts and actions at a higher construal level. Individuals with strong ideological beliefs on specific issues such as human's relationship with the environment or the structure of our society think and act based on their value, regardless of whether climate impacts were portrayed as distant or close.

Communication researchers and practitioners could benefit from our findings. Presenting climate change in a spatially and socially close fashion could potentially motivate the public to focus on the issue itself without being distracted by meaningless ideological debates. Such effects may be even more pronounced if familiar objects are utilized to facilitate issue-oriented discussions. Cultivating the sense of closeness is even more critical when strong issue-specific value are yet to be formed in segments of the population, especially for novel topics such as human genome editing (Scheufele et al., 2017). Therefore, communication scholars need to identify more effective strategies to narrow the psychological distance of important social issues for specific target audiences before they are absorbed into the ideological debate.

## Declaration of interest

None.

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